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Direct proof of Cosmic Ray acceleration by Supernova Remnants with the AGILE satellite

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On behalf of AGILE team, I present our work on cosmic-ray acceleration by the some Supernova Remnants, focusing on the SNR W44. Recent analyses suggest that several SNR observations can be understood in terms of hadrons accelerated in correspondence of the SNR forward shock. Until now, however, the leptonic contribution can not be definitely excluded. In the gamma energy band, Fermi/LAT satellite can give only data at energies > 200 MeV because its sensitivity is no so good at lower energies. In the case of W44, AGILE extends the Fermi/LAT spectrum (Abdo et al., 2010) at energies < 200 MeV, showing clearly a low energy decrease. This feature allows us, assuming three different particle distributions, to exclude definitely for the first time the leptonic origin of the gamma-ray emission from a SNR and to show that the hadronic scenario is the only one that can model the W44 broad band energy spectrum. We give an unambiguous proof of the cosmic-ray origin from Supernova Remnants.

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